Smart note maker

1. ABSTRACT The Smart Note Taker is such a helpful product that satisfies the needs of the people in today’s technologic and fast life. This product can be used in many ways. The Smart Note Taker provides taking fast and easy notes to people who are busy one’s self with something. With the help of Smart Note Taker, people will be able to write notes on the air, while being busy with their work. The written note will be stored on the memory chip of the pen, and will be able to read in digital medium after the job has done. This will save time and facilitate life. There will be an additional feature of the product which will monitor the notes, which were taken before, on the application program used in the computer. This application program can be a word document or an image file. Then, the sensed figures that were drawn onto the air will be recognized and by the help of the software program we will write, the desired character will be printed in the word document. If the application program is a paint related program, then the most similar shape will be chosen by the program and then will be printed on the screen. Since, JAVA Applet is suitable for both the drawings and strings, all these applications can be put together by developing a single JAVA program. The JAVA code that we will develop will also be installed on the pen so that the processor inside the pen will type and draw the desired shape or text on the display panel. 2. INTRODUCTION The Smart Note Taker is such a helpful product that satisfies the needs of the people in today's technologic and fast life. This product can be used in many ways. The Smart Note Taker provides taking fast and easy notes to people who are busy one's self with something. With the help of Smart Note Taker, people will be able to write notes on the air, while being busy with their work. The written note will be stored on the memory chip of the pen, and will be able to read in digital medium after the

job has done. This will save time and facilitate life. The Smart Note Taker is good and helpful for blinds that think and write freely. Another place, where our product can play an important role, is where two people talks on the phone. The subscribers are apart from each other while their talk and they may want to use figures or texts to understand themselves better. It's also useful especially for instructors in presentations. The instructors may not want to present the lecture in front of the board. The drawn figure can be processed and directly sent to the server computer in the room. The server computer then can broadcast the drawn shape through network to all of the computers which are present in the room. By this way, the lectures are aimed to be more efficient and fun. This product will be simple but powerful. The product will be able to sense 3D shapes and motions that user tries to draw. The sensed information will be processed and transferred to the memory chip and then will be monitored on the display device. The drawn shape then can be broadcasted to the network or sent to a mobile device. There will be an additional feature of the product which will monitor the notes, which were taken before, on the application program used in the computer. This application program can be a word document or an image file. Then, the sensed figures that were drawn onto the air will be recognized and by the help of the software program we will write, the desired character will be printed in the word document. If the application program is a paint related program, then the most similar shape will be chosen by the program and then will be printed on the screen. 3. SYSTEM OVERVIEW 3. 1. CONSTRUCTION Since, JAVA applet is suitable for both the drawings and strings, all these applications can be put together by developing a single JAVA applet program. The java code that we will develop will also be installed

on the pen so that the processor in the pen will and type the able to draw desired text on the display panel. Applet: Applet is a function of java which for example, is a kind of container (file) which contains a set of programs made in java. Java is a high level language. It is widely used in making various applications Based on java. It is one of the best features of java. The various strings, drawings etc will be made using a class file and this file will not be a single file. It will be a set of files linked together in a single Database: The system installed in the pen will consist of a database which will help the processor to recognize various words made visually in the air. Each word written in the air will resemble to a word in the database and the word present in the database will be printed. This will remain the basic principle of the working of a smart note taker. Working: Smart note taker will be simple but powerful. The product will be able to sense 3D shapes and motions that user tries to draw. The sensed information will be processed and transferred to the memory chip and then will be monitored on the display device. The drawn shape then can be broadcasted to the network or sent to a mobile device. There will be an additional feature of the product that will monitor the notes, which were taken before, on the application program used in the computer. This application program can be a word document or an image file. Then, the sensed that were drawn into the air will be recognized and with the help of the software program software we will write the desired character will be printed in the word document. If the application program is a paint related program, then the most similar shape will be chosen by the program and then will be printed on screen. 3. 3. TECHNICAL DEFINITION OF THE PRODUCT In order to meet the technical requirements of the product we need Operating System Like Windows or

Linux in order to implement software part of the project, Displacement Sensors to recognize the displacement of the pen in three dimensions, parallel cable to communicate with computer, software to solve the displacement data and finds the individual coordinate displacements in three axes and transform the data into text format, analog to digital converter to process analog displacement data and convert them into digital format, switch to control the pen and Rechargeable battery. - Operating System - Software program to convert data into text or string format - Displacement Sensor - Parallel cable - Analog to digital converter - Switch - Rechargeable battery 4. CURRENT PRODUCTS 4. 1 MOBILE NOTE TAKER The Ultimate Handwriting Capture Device Mobile Note Taker is the world’s first portable handwriting capture device based on natural handwriting as an input. Attach plain paper of any kind and use Pegasus the electronic pen to capture, store and share handwritten drawings, sketches, notes, and memos at meetings, lectures, and conferences. Mobile Note Taker has a built-in LCD to confirm input. The on-board flash memory can store up to 50 pages (size A4). Mobile Note Taker works in two modes: - mobile mode and Connectedmode. In mobile mode note taker receiver unit is not connected to a PC via USB cable. In connected mode the base unit is connected to a PC through USB cable. Features &Benefits: Uses standard paper - no special paper required Stores up to 50 A4 pages Includes LCD to view and confirm input Operates both in mobile mode and when connected to PC, notebook or other device Connects to PC/Notebook via USB cable (included) Includes software for synchronization and management of stored files Writes directly into MS® Office applications (in Connected mode) Allows file transfer over LAN, email, and instant messaging application (in connected mode). Capture, Organize,

and Share Your Notes Digitally-Anywhere, Anytime! Mobile Mode Enables capture and storage of notes and sketches digitally at meetings, lectures, and conference. Connected mode synchronizes the Mobile Note Taker and a PC/Notebook via USB cable (included). You can upload, organize, move, edit or add to handwritten notes, ideas, sketches, phone numbers, or reminders. The included software also enables memos, notes, and sketches to be sent via e-mail or over the LAN network. It is also possible towrite directly into MS® Word or Outlook, and add a personal touch to ICQ® instant messages. Based on Pegasus' successful PC Notes Taker, Mobile Note Taker is the ultimate handwriting capture device. Even if you don't have standard size paper or piece of paper with you - you can use anything - an envelope, an old receipt, a tear-off from a paper bag and best of all in your own natural and writing. As long as you have the Mobile Note Taker, you can jot down your most inspired ideas and be sure that you'll never lose them again. 4. 2. PC NOTE TAKER PC Notes Taker is the world's first device that captures natural handwriting on any surface onto a PC in real time. Based on a revolutionary electronic pen, PC Notes Taker displays the user's handwritten notes, memos or drawings on the computer, and stores the image for future use. PC Notes Taker is ideal for markets where handwritten input is essential, such as health, educational and financial sectors. Supplied with user-friendly software, PC Notes Taker is compatible with PCs and notebooks. Adds Handwriting Input to any Computer PC Notes Taker is the world's first device that captures natural handwriting on any surface onto a PC in real time. Based on a evolutionary electronic pen, PC Notes Taker displays the user's handwritten notes, memos or drawings on the computer, and stores the image for future use. PC Notes Taker is ideal for markets where handwritten

input is essential, such as health, educational and financial sectors. Supplied with user-friendly software, PC Notes Taker is compatible with PCs and notebooks. Features & Benefits: Capture of handwriting from any plain paper or other writing surface Input of continuous writing up to A4 page size Insert sketches, signatures, equations, and notes into Word® documents E-mail sketches or handwritten notes in any language using MS® OUTLOOK Convert handwriting to digital text using MS® word recognition engine Annotate, add comments, edit and draw in your own handwriting onto MS® office documents Create instant messaging using ICQNEW. 4. 3. SMART PEN The Smart Pen is a device that resembles a fat pen or stylus, but contains a tiny computer and a set of sophisticated sensors that record and analyze every motion, and then transmit this information to a nearby computer via infrared, radio or direct electric signal . A Smart Pen helps a computer to recognize handwritten or drawn input. A computer is treated as 1 level of Complexity higher in its ability to recognize the handwriting of anybody who uses a Smart Pen. Costs $50, weight is negligible. SOLO PEN: This is a progressive development of the Smart Pen : a pen with sufficient processing power to recognize handwriting on its own with the equivalent of Complexity 1. It can also be used as a Smart Pen. Every Solo Pen has a long, narrow screen that displays the writing for the user to check. The user of a Solo Pen can write on a regular writing surface, as the Solo Pen has a normal writing tip. TL8 Solo Pens have trouble with the spatial relationship of writing, so if the user writes three lines on paper and then wants to write a heading above the first line, the Solo Pen might put it a line higher or lower than desired. The user can also write in the air, but this requires an IQ roll to avoid mistakes. TL8 Solo Pens are great for short notes on the run, not for novel

writing. TL8 Solo Pens can be used in a Virtual Reality environment. The pen continually transmits its location to the VR manager, which displays the writing in the virtual environment. The data is stored and downloaded to a computer via infrared. A Solo Pen is TL8, costs $100 and has negligible weight. It has a rechargeable A Power Cell, but do not bother about energy as long as the Pen is placed into its recharging stand (comes with the pen). SMART QUILL: Dubbed Smart Quill, the sleek and stylish prototype pen is different from other electronic pens on the market today in that users don't have to write on a special pad in order to record what they write. Instead, Smart Quill contains sensors that record movement by using the earth's gravity system, whether you write on paper or in the air. Smart Quill isn't all space age, though it contains an ink cartridge so that users can see what they write down on paper. " Why should people use a keyboard when they can use a pen?" said John Collins, project manager for Smart Quill at BT Labs. Many people have never learned to type quickly and accurately, but everyone knows how to write, he pointed out. The pen works in conjunction with a regular PC; onto which users install special handwriting recognition software developed by BT Labs, Collins said. Users write down notes in their regular handwriting and the movements are stored within Smart Quill. Up to 10 pages of notes can be stored locally on the pen, Collins said. Once the pen is hooked up to the computer, the handwriting recognition software translates the movements into text on-screen. Unlike many handwriting recognition programs, the Smart Quill system analyzes movements instead of shapes, Collins said. This allowed BT to get rid of the electronic notepad associated with most computer pens. Smart Quill contains a few local applications such as an address book, daily planner, and calculator. Users

can enter information into these applications by pushing a button on the pen and writing down what they would like to enter, Collins said. There is also a small three-line screen to read the information stored in the pen; users can scroll down the screen by tilting the pen slightly, he said. One of the major asset is that Smart Quill does not need a screen to work. This is possible through revolutionary " Spatial Sensing" system which uses semiconductor accelerometers. Accelerometers senses pen/hand movement instead of shapes. It also automatically detects left or right handed use. 5. TECHNOLOGY 5. 1 DISPLAY TECHNOLOGY Technology used in SmartNoteTaker for display is Kopin Corp’s Cyber Display technology. Cyber Display is a¼ inch diagonal LCD that uses circuitry built on a silicon wafer, then removed and mounted to glass. The displays are integrated to miniature monitors using its own backlighting, optics, ICS and packaging. Fig: 5. 1 Display Technology 5. 2 HANDWRITING RECOGNITION: - Accelerometers measure hand movement in 2 or 3 planes - On board DSP converts to ASCII characters for pen applications - Write on paper, flat surface, and vertical wall or in air - Single character recognition on pen SmartNoteTaker works by measuring the pen's movements and matching them to the movements that produce letters and words programmed into its memory. It's similar to the way a microphone detects sound. Consistency of handwriting, rather than neatness, is the only condition for accuracy. There are 2 techniques used for this purpose : 1) Accelerometer technology 2) Handwriting recognition software Accelerometer Technology: This technology uses a device called Accelerometer which is used for measuring motion. A tiny accelerometer in a pen could be used to detect the stops and starts, arcs and loops of handwriting, and transmit this information to a small

microprocessor that would make sense of it as text. There's also the possibility of viewing a full page of text through a special monocular magnified " virtual" screen that could be built into the end of the pen. Invisible writing in air is achieved through this unique technology called accelerometer that monitors hand movements and can also be used as a ‘ virtual hinge’ to scroll around the small screen on the pen and detect left or right- handed use. It records movement by using the earth's gravity system, whether you write on paper or in the air. Hence it is independent of surface used. Movements are stored within the SmartNoteTaker. This information is transmitted on to a small microprocessor that would make sense of it as a text displayed on the sleek built in screen. There are 2 types of accelerometer: 1. Two Axes Accelerometer: This accelerometer measures acceleration in two axes. An Example for Two Axes Accelerometer is ADXL202 Accelerometer. 2. Three Axes Accelerometer: This accelerometer measures acceleration in three axes. An Example for Three Axes Accelerometer is Tronics +/- 2g accelerometer. An accelerometer is a device that measures proper acceleration. This is not necessarily the same as the coordinate acceleration (change of velocity of the device in space), but is rather the type of acceleration associated with the phenomenon of weight experienced by a test mass that resides in the frame of reference of the accelerometer device. Prototype of SmartNoteTaker: This SmartNote Taker prototype records writing on paper for radio transmission to a pocket pc, desktop, cell phone or tablet computer. The accelerometer tracks the angular movement of the top of the pen at an angle in the air and these angles plotted as x/y position on pc screen. An early hardware prototype picture shows, left to right, tilt sensor , PIC 8 bit microcontroller, batteries,

and 433Mhz 1200 Baud radio transmitter. Currently a radio receiver on the RS232 port of a pc records the pen movement for analysis via pc. The pen will power down after a period of no movement so doesn't need an on/off switch. The battery life is approximately 22 hours. Handwriting Recognition Software: This software embedded in the microprocessor of the pen is used to recognize handwriting of the user. Pen works in conjunction with a regular PC on to which users install special handwriting recognition software. The handwriting recognition software translates movements in to text on screen. Handwriting recognition software constitutes two major phases: i) Handwriting transcription ii) Handwriting recognition i)Handwriting Transcription In this phase, the recorded acceleration signals are then transcript to its original form. Here this aspect is solved using ‘ simple’ double integration method in order to retrace the pen tip movement on paper. Method: -In order for this principle to work properly, we have to solve two main problems: -Firstly, we have to know pen’s spatial orientation in order to withdraw the earth gravity component to the measured accelerations. -Secondly, we have to succeed in the double integration, which is to solve all the derivation problems due to this method. 7 ii) Handwriting Recognition: The second huge aspect is the characters and signatures recognition. The hardware (accelerometers plus contact detector) embedded in the pen has proved a really efficient combination for this application. Method -The same method is used to recognize the characters written by a single user and to find whose signature is the one that has just been done. -We use a simple Euclidian distance as the comparison process, and of course the decision process is the smaller distance found. -The first step consists in creating the reference database for the characters as for the

signatures. For this a mean signal is computed for each recorded symbol. - The second step is the recognition process 1. For the creation of database, each symbol was reproduced several times and a mean normalized symbol was computed. 2. For recognition process, the unknown symbol is first normalized, the distance between this symbol and the entire database symbol is computed. Then the unknown symbol is recognized as the one with the lowest distance. 6. 1 ADVANTAGES -Can be used as standard pen and can carry anywhere without stressing mind to carry it. - With the help of smart note taker we can write notes on any surface even in air. That is we can write notes any time without using a paper. - is used along with paint and JAVA graphics so we can say this product is compatible with all graphics software. -Light weighted and easily portable -on phone talks or for instructor. -Useful for any person, any institute. 6. 2 DISADVANTAGES - Expensive -No templates and other sophisticated formats available. -Can’t drag items to other tabs directly. -Awareness requires. 7. APPLICATIONS - With the help of smart note taker handwritten notes will be instantly converted into editable text - Another place, where this product can play important role is where two people talk on the phone. The subscribers are apart from each other while their talk and they may want to use figures or text to understand themselves better. - Can be use by teachers directly and indirectly by students, too - Smart note taker is reliable and powerful. - It is helpful for blinds that think and write freely. - Smart note taker is used for instructors in presentations. - It is used along with paint and JAVA graphics so we can say this product is compatible with all graphics software. - Easy-to-use wireless connection. 8. FUTURE SCOPE Companies had succeeded to make similar products and put them in the market. Putting a newly invented,

innovative product in the market is not easy. The prices in the market must be well observed for similar products. The prices of 2-D digital pens are about 50 dollars to 90 dollars. So the price of smart note taker will be high. But this disadvantage definitely is eliminated in near future. Future models could receive e-mails and pager messages via a wireless messaging system and could use digital signature recognition for security purposes. Working on improving the handwriting recognition software and expects it to understand cursive. 9. CONCLUSION ïƒ˜ The system will try to improve a pen, which helps people get rid of typing problems on computer by the technology, which converts your handwriting to text format on your PC. This technology provides taking notes on air. Beside this, it can also be used like all other classical pens. Therefore, this device will increase the capacity of noting the texts, lessons and projects you work on. 10. REFERENCES ïƒ˜ http://en. wikipedia. org/wiki/Accelerometer ïƒ˜ http://wiki. openmoko. org/wiki/Technical: Accelerometer_Fundamentals ïƒ˜ http://www. seminarprojects. com/Thread-smart-note-taker--6901 ïƒ˜ http://www. youtube. com/watch? v= Ky9dVevsm8o ïƒ˜ http://www2. smarttech. com/st/en-US/Products/Interactive+Pen+Displays/ ïƒ˜ http://www. cnn. com/TECH/computing/9810/16/smartpen. idg/ ïƒ˜ IEEE Paper- portable note taker for the blinds