Problem-Solution fit canvas 2.0

Purpose / Vision

Define CS, fit into CC

1. CUSTOMER SEGMENT(S) — CS

Who is your customer?

The use of doctor-computer interaction devices in the operation room (OR) requires new modalities that support medical imaging manipulation while allowing doctors' hands to remain sterile, supporting their focus of attention, and providing fast response times. This paper presents "Gestor," a vision-based hand gesture capture and recognition system that interprets in real-time the user's gestures for navigation and manipulation of images in an electronic medical record (EMR) database. Navigation and other gestures are translated to commands based on their temporal trajectories, through video capture. "Gestor" was tested during a brain biopsy procedure. In the in vivo experiment, this interface prevented the surgeon's focus shift and change of location while achieving a rapid intuitive reaction and easy interaction. Data from two usability tests provide insights and implications regarding human-computer interaction based on nonverbal conversational modalities.

6. CUSTOMER — CC

What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.

(i) ease of use—the system allows the surgeon to use his/her hands, their natural work tool

(ii) rapid reaction—nonverbal instructions by hand gesture commands are intuitive and fast (In practice, the “Gestor” system can process images and track hands at a frame-rate of 150 Hz, thus, responding to the surgeon's gesture commands in real-time)

(iii) an unencumbered interface—the proposed system does not require the surgeon to attach a microphone, use head-mounted (body-contact) sensing devices or to use foot pedals

(iv) distance control—the hand gestures can be performed up to 5 meters from the camera and still be recognized accurately. The results of two usability tests (contextual and individual interviews) .

5. AVAILABLE SOLUTIONS — AS

Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons dothese solutions have? i.e. pen and paper is an alternative to digital notetaking

In this work, the user is allowed to interact with the medical image and 3D visualized model using a touch-less based interaction technique. This method is done by recognizing the gestures shown by the user. Gestures recognition process become much easier by using inexpensive sensor. Application is developed to recognize the gestures and simulate inputs corresponding to gestures. Each gesture has its own operation on the medical image or 3D volumetric visualization.

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEMS — J&P

Which jobs-to-be-done (or problems) do you address for your customers?There could be more than one; explore different sides.

According to [4] human-computer interaction is fundamental to the discipline of information technology. Any computing system is said to be interactive when it involves one or more interface that allows users to give commands and get results. Development using the graphical user interface, which gives the users from varying levels of knowledge about computers, allows them to understand how to use the application.

9. PROBLEM ROOT CAUSE — RC

What is the real reason that this problem exists? What is the back story behind the need to do this job?
i.e. customers have to do it because of the change in regulations.

A tracker to track and recognize independent hand posture and trajectory and send the information to the host application. Improvement is made in [10] by replacing the tracking system with a Wii mote to allow exploration for medical data at a distance. The idea from these projects about the gesture control interface are very convincing but these solutions are unsuitable to be use in the medical field especially in the operating rooms where non-stabilizable devices are not permitted to avoid contamination of the patient, the OR and the surgeon. There are also vision-based interfaces have been proposed to be used in the operation room. A system named Gestor is presented in [11] which is a video-based hand gesture recognition system. It allows user to navigate and manipulate magnetic resonance images (MRI). The problem with the system is vision-based interfaces need to contend with other problems since the vision can be affected by room lighting, user movement and the background of the user.

7. BEHAVIOUR — BE

What does your customer do to address the problem and get the job done?
i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)

Medical image contains many slices that can be process and visualize in 3D volumetric model. The medical visualization application allows users to change the image slice so that they can study the image from different position. Changing image slice can be done by swiping one hand in up or down direction to change the image slice. This gesture is only valid to be used on 2D medical image.

Focus on J&P, tap into BE, understand RC

Identify strong TR & EM

3. TRIGGERS — TR

What triggers customers to act? i.e. seeing their neighbor installingsolar panels, reading about a more efficient solution in the news.

The available gestures in the application used to control and manipulate the medical image and visualization model. Rotation can be done using 1 hand at the front, pointing at the start position and drag to rotate it based on the needs to rotate the visualize model. We can see that action signifies holding and turning the object.

4. EMOTIONS: BEFORE / AFTER — EM

How do customers feel when they face a problem or a job and afterwards?
i.e. lost, insecure > confident, in control - use it in your communication strategy & design.

The essential hardware required for this application to run is the Kinect itself as the camera used to track the user. There are many cameras that equipped with depth sensor by Kinect is among the best in term of price and performance. The availability of Kinect also is the one of the factor because it is easily to find all over the world.

10. YOUR SOLUTION — SL

If you are working on an existing business, write down your current solution first,fill in the canvas, and check how much it fits reality.
If you are working on a new business proposition, then keep it blank until you fill inthe canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behavior.

This model uses the integrated webcam to capture the video frame. The image of the gesture captured in the video frame is compared with the Pre-trained model and the gesture is identified. If the gesture predicts is 1 then images is blurred;2, image is resized;3, image is rotated etc.

8. CHANNELS of BEHAVIOUR — CH

8.1 ONLINE

What kind of actions do customers take online? Extract online channels from #7

The gesture that provided in the application that can be used in the application. There are also gestures that can be used to do operation that not related in navigate and manipulate the visualization. Each gesture has its own operation to avoid confusion.

8.2 OFFLINE

What kind of actions do customers take offline? Extract offline channels from #7and use them for customer development.

Kinect sensor and the medical visualization application so that the visualized model is ready to be used with the application. The interaction flow start with hand and arm gestures from user. Kinect will track the user movement and send the information to the application for the gesture recognition process.

Extract online & offline CH of BE

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