Weekly Report 09

I-CEE (Group 8)

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VIBRO-I

Due Date:

29.04.2008

Past Week's Accomplishments:

- We tried to make necessary search in order to determine suitable programming language for the implementation to be done. Search was done while keeping in mind that another solution being considered like buying special image processing software. This alternative solution for implementation of image processing was proposed by Bülent Özgüç in the preliminary presentation.
- According to the feedback we have been receiving, components we already have were assessed again. Search for these certain components, which has been carried on by EE members of the team for the order of the ultimate parts has also been altered regarding the criteria aspect in order to keep up with recent suggestions.
- With these feedback, we worked on an approach which is named the Scale Invariant Feature Transform (SIFT), as it transforms image data into scale-invariant coordinates relative to local features.

  This approach has 4 stages which are:

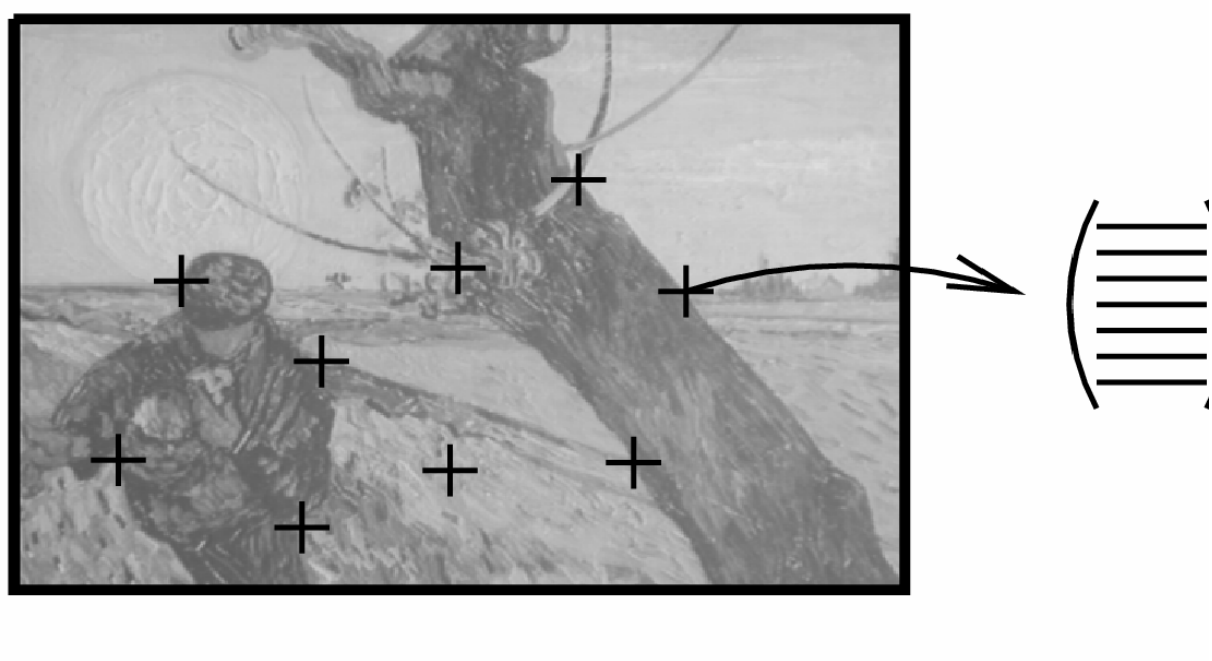
  1- Scale-space extrema detection: The first stage of computation searches over all scales and image locations. It is implemented by using a difference-of-Gaussian function in order to determine potential interest points that are invariant to scale and orientation.

2- Keypoint localization: At each candidate location, a detailed model is fit to determine location and scale. Keypoints are selected based on measures of their stability.

3- Orientation assignment: One or more orientations are assigned to each keypoint location based on local image gradient directions. All future operations are performed on image data that has been transformed relative to the assigned orientation, scale, and location for each feature, thereby providing invariance to these transformations.

4- Keypoint descriptor: The local image gradients are measured at the selected scale in the region around each keypoint. These are transformed into a representation that allows for significant levels of local shape distortion and change in illumination.

- At this point, we mostly stres our study on the first two stages of the Scale Invariant Feature Transform and in order to illustrate the approach of the first two stages we refer to the figure below. We tried to get an input by a camera and tried to scale it in terms of pixels. Then we tried to find their key points which corresponds to key point localizatıon stage.



- We worked on the portable power supplies. However, we could not adjust their currents that is suitable for our circuit. They caused some distortions on transistors and sensors that we constructed as a demo.

- Reviewed Business Plan is also finished and handed.

Next Week's Planned Activities:

- We will reconstruct our demonstration circuit that is distorted by power supplies. So, we will reorder some of the devices that we used.
- Since processor board heavily depends on the camera, we also cannot be able to find a suitable processor board at the moment since we stil look for a suitable camera meeting our needs that is to be portable enough and having sufficient frame detection capabilities.
- We plan to work and improve ourselves on the first two stages of the Scale Invariant Feature Transform (SIFT). And then we will go trough the remaining two stages.
- We will try to adjust already ordered portable power supplies. One of these supplies work with 9V DC and the other is 4,5V DC. We will try to adjust their currents applicable to our circuit.