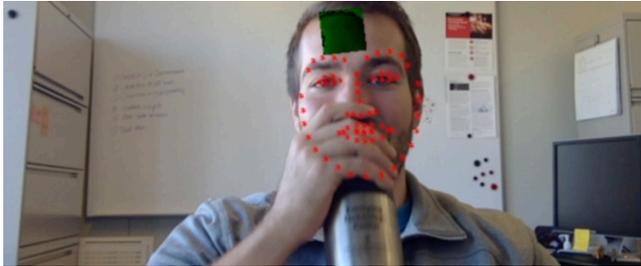
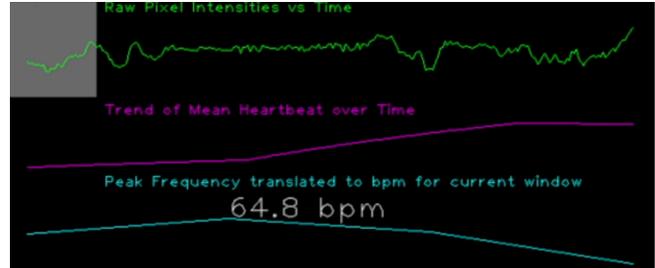


# Real-Time Extraction of Heart Rate from Video



Using a standard webcam to extract heartrate



## Why biometrics?

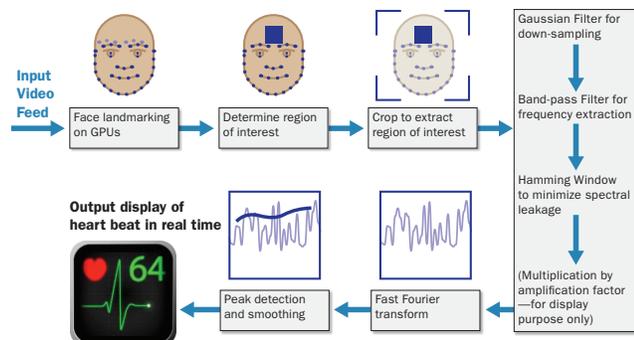
Biometric traits hold incredibly useful, but hidden, information, and emerging technologies can revolutionize how we extract and analyze that information.

At the SEI, we apply our knowledge and expertise in the fields of machine learning and predictive analysis along with emerging and rapidly changing technologies such as mobile computing and GPUs to develop new, efficient approaches to biometrics collection and analysis.

## Extracting Heart Rate from Video

Subtle changes in the color of the face can reveal a subject's heartbeat. We have designed and implemented algorithms to extract heart rate from video of non-stationary subjects' faces in practical settings in real time. Our work makes it possible to obtain heart rate information using only a standard web camera.

Our solution uses facial landmarking to determine the region of interest where heart rate is most obvious (forehead and cheeks), and we use GPUs to speed processing.



Our approach

## Results

We have developed an application that extracts heart rate from standard webcam video in ~15 seconds. Our application can handle mobile faces in natural (non-laboratory) conditions and can automatically detect skin tone and scale the calculation of the red channel in a proportional manner. For webcam input, we are accurate within 2 beats per minute. For pre-recorded movie input over 35 trials, we are accurate within 5 beats per minute.

## Applications for Our Work

- monitoring of multiple subjects at security checkpoints
- finding live soldiers in the battlefield
- detecting face liveliness to counter face spoofing
- polygraphs, high-stakes meetings
- continuous emotion recognition from videos
- media analysis and media exploitation
- machine emotional intelligence
- medical applications, especially in developing countries

## Contact Us

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