



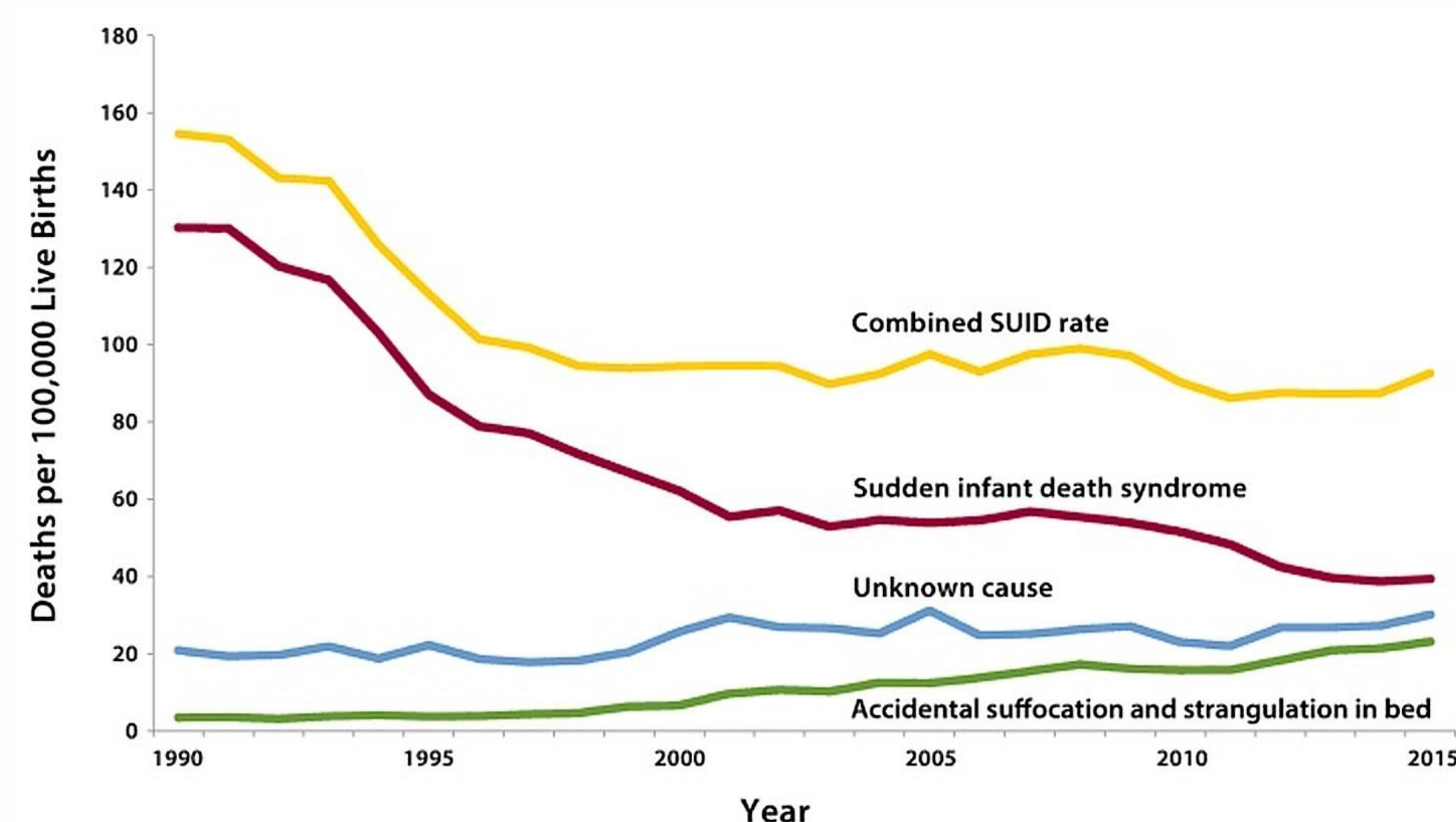
ABSTRACT

Sudden Infant Death Syndrome is an unpredictable tragedy where a seemingly healthy infant under a year old perishes, usually while sleeping. To increase an at-risk infant's probability of surviving the onset of SIDS and give parents peace of mind Mazu Medical developed a smart baby monitor. This monitor, a crib mounted video camera connected wirelessly to a bedside display unit, uses real-time Eulerian Video Magnification to detect heart rate. If the infant's heart rate becomes critically low, the monitor activates a 3 stimulus response consisting of an alarm, bright flashing lights, and vibration attempting to induce crying, arousing the infant and alerts parents via their bedside unit.

BACKGROUND

Sudden Unexpected Infant Death (SUID) and Sudden Infant Death Syndrome (SIDS)

- SUID is the sudden and unexpected death of an infant younger than 1 year of age, often happening during sleep or in the baby's sleep area
- SIDS is a type of SUID occurrence that cannot be explained even after a full investigation
 - About 3,500 babies in the US die suddenly and unexpectedly each year



Source: CDC/NCHS, National Vital Statistics System, Compressed Mortality File.

Current SIDS monitoring devices

- Sensors in physical contact with infant to monitor heart rate
 - Older models still utilize dangerous wired connections
- Solely provides alarm to the parents
 - Offers no reactionary response to infant

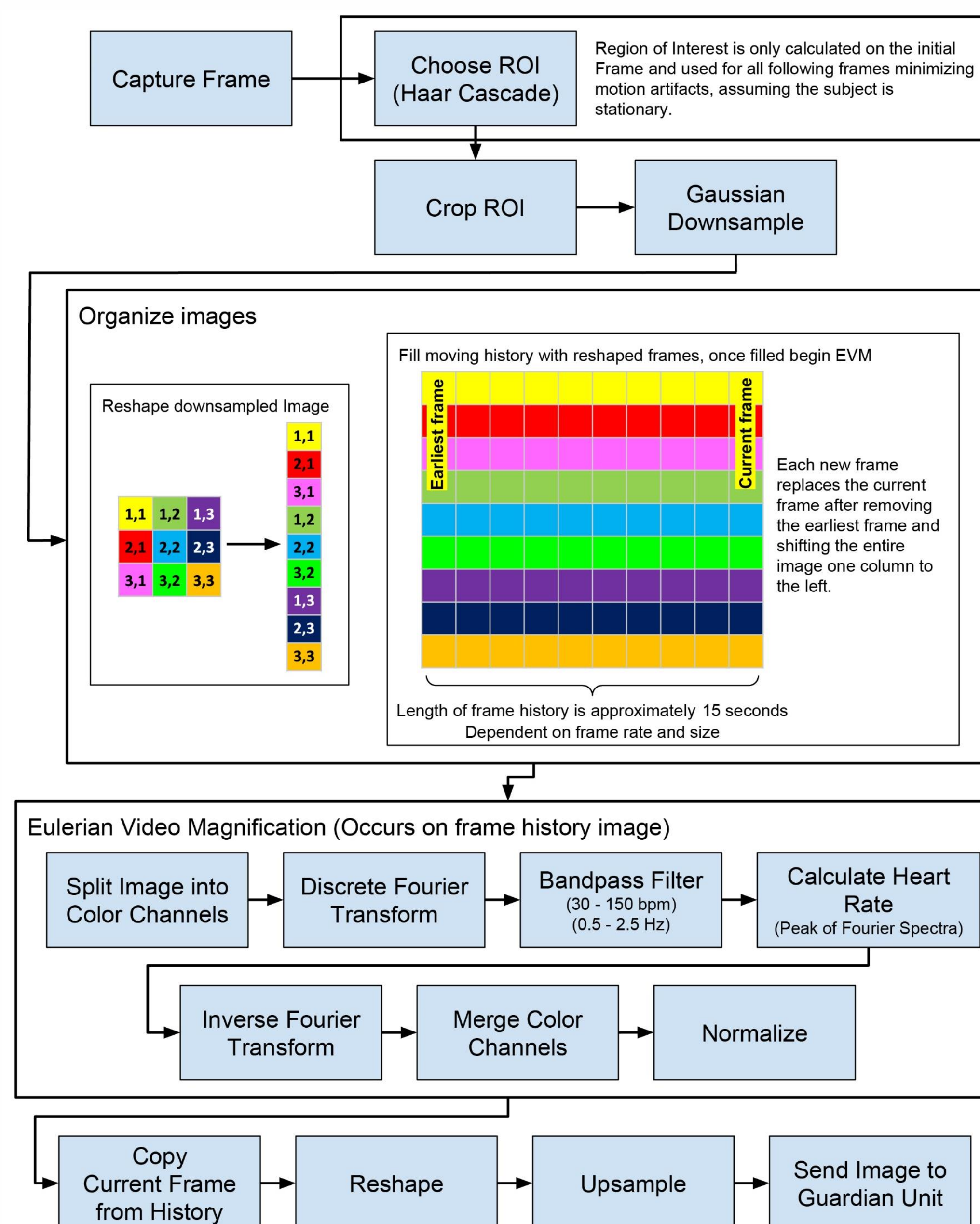
METHODS

Mazu Medical's Goal

- Provide a non-invasive method to calculate heart rate real time
- Provide a device which attempts to increase the chances of SIDS survival for infants at risk of recurrent episodes of apnea, bradycardia, and hypoxemia

Mazu Medical's Approach

- Eulerian Video Magnification for Heart Rate Calculation
Inspired by previous work in video magnification, our EVM pipeline magnifies the color change of ones face and calculates heart rate in real time.



- '3 Stimulus' Response at the Indication of SIDS Occurrence
- Provided in attempt to startle/jolt the infant and induce crying, therefore breathing and a heart rate
 1. Visual stimulus via an array of 40 LEDs
 2. Audio stimulus via an alarm produced by a pair of 3W 4 Ohm Speakers
 3. Tactile stimulus via an array of 10 coin vibration-motors positioned within a pad beneath the infant's crib sheets

RESULTS

Crib Camera Unit

- Contains low-light camera, LED array, and speaker pair
 - Vibration-motor array connected via cord out of infant's reach
- Positioned on top railing of infant's crib
- Adjustable angle for best camera view

Guardian Bedside Unit

- Contains 5in LCD touchscreen which provides the parents with a live video feed and current calculated heart of their infant
- Equipped with a pair of speakers to provide an indication alarm to the parents



ACKNOWLEDGMENTS

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