interesting systems

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We have come together for this competition to make something interesting.

We hope that it is.

“How am I doing?”

Use low cost cameras to monitor wellbeing in the home

Alert carers to changes in behaviour

interesting systems

Our Idea

- There are lots of systems that track you as they move around your home by using passive infrared (PIR) sensors

- We want to make a device that tracks how well you can do things
- This won’t just tell us where you are, it will tell us how you are doing..

Making a cup of tea…..

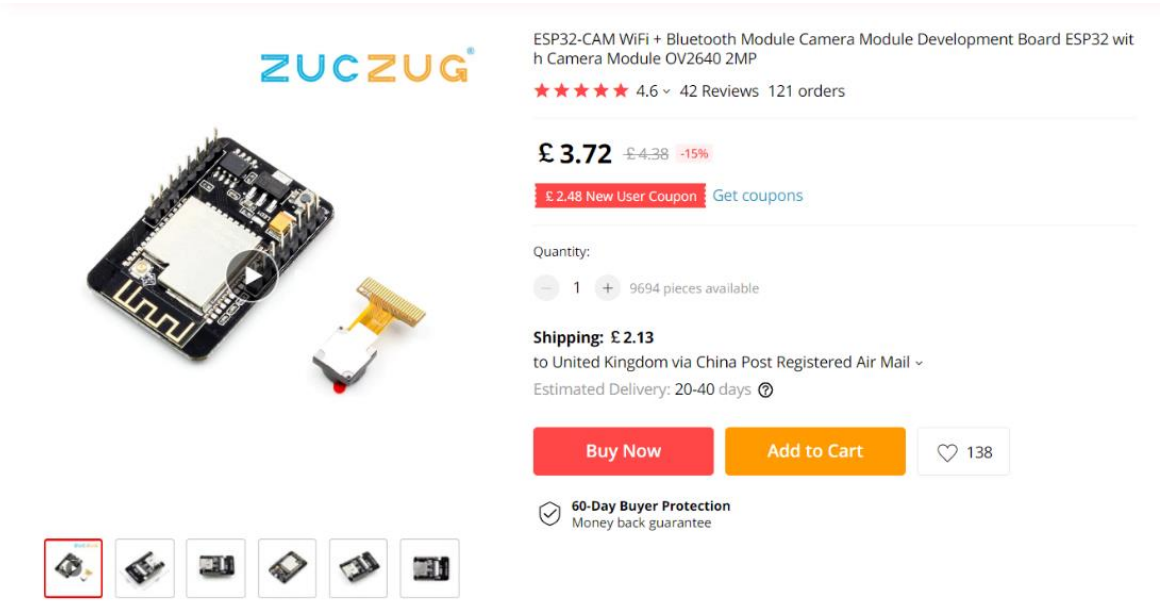
- Making a cup of tea is a complex activity
- If we can measure how well you can make tea we can get a feeling for how “well” you are
- We can break the activity down into a number of steps

Making a cup of tea…..

1. Walk into the kitchen
2. Go to the kettle
3. Go to the sink
4. Go back to the kettle
5. Go to the cupboard
6. Go back to the kettle
7. Wait for the kettle to boil
8. Go back to the kettle

Low cost action tracking

- We use a low cost camera and processor combination to track the stages of an activity like tea making
- We deliberately simplify the video image to make it very easy to track movement
- Our camera will look for movement against a static background (the kitchen)



Our “kitchen”

- The camera starts with a static image of the kitchen and then detects movement in the kitchen
- We detect you in the frame by tracking the differences caused when you enter the frame and move around in it

Go to the “kettle”

- We can drawn a box around the largest difference area it has detected
- The position of the box tells us where you are
- This you have just moved to the kettle..

Go to the “cupboard”

- When you move to the cupboard the we detect movement in a different part of the frame
- You are now at the “kettle”

Tea making skills

- We can time how long you spend at each location in the kitchen
- Over time we create profiles of different activities
- We can then track how well each activity is performed and check for variations
- That way we can detect changes over time

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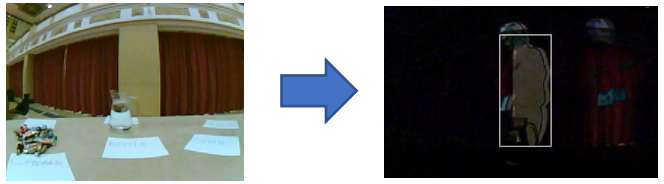
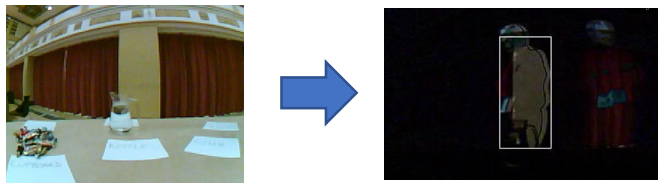
Our system in action



Detect changes in the image and track them

Smart Camera

Our system in action



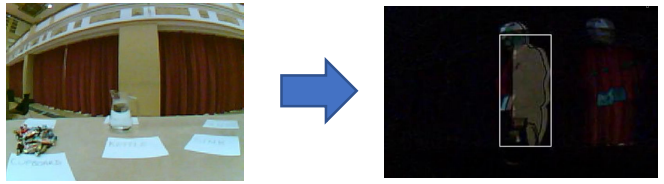
Detect changes in the image and track them

Smart Camera

Send movement profiles

Cloud

Our system in action



Detect changes in the image and track them

Smart Camera

Send movement profiles

Cloud

Track movement against stored profiles

Our system in action

Messaging

Detect changes in the image and track them

Smart Camera

Send movement profiles

Cloud

Track movement against stored profiles

OK

If the movement fits an existing profile all is well

Our system in action

Messaging

Detect changes in the image and track them

Smart Camera

Send movement profiles

Cloud

Track movement against stored profiles

OK

Having Difficulty

If the movement is outside the regular pattern this could be flagged

Our system in action

Messaging

Detect changes in the image and track them

Smart Camera

Send movement profiles

Cloud

Track movement against stored profiles

OK

Having Difficulty

Stuck

If the movement is incomplete a carer is alerted

“Free Standing” solution

- Provided when the client has no internet connection
- Intelligent cameras build activity profiles by monitoring the activity of the client
- The cameras send alerts and status messages over the LoRa WAN network
  - LoRa is a low power wide area network
  - LoRa devices talk to local LoRa gateways to send packets of status or alarm messages

“Connected” solution

- Makes use of a home internet connection
- Allows the system to monitor the completion of Alexa driven activities
  - Alexa can issue each instruction to make a cup of tea and the system could validate that the user has moved to the correct position
  - Carer would “train” the system by performing the action at installation

The Deployment Story

- Cameras are factory configured with a network address
- Each device is labelled with a QR code that contains a web address containing the camera ID
- This initiates a web-based registration process in which the carer enters their details and linking them to the sensor

Business model

- Customers are happy paying subscriptions
  - It means that the service has ongoing support
- The system hardware would be sold at close to cost and customers would pay around £5.00 a month for ongoing support

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Our company

- We don’t have a company to take this to market
  - Unless you want to offer us a truck load of money – in which case we are all ears
- Our plan would be to prototype the system and then make the designs and software freely available on GitHub for exploitation
  - We have a local community company which will be doing this: connectedhumbercic.com
- It would be of interest to companies already operating in this space

Thank You

- Thanks for listening
- Hope you found it useful