

**FOR ALL (40 minutes):**

Consider a camera of 2040 rows x 2580 columns whose pixel size is 2  $\mu\text{m}$ . Image of acquiring a scene for analysing objects of 50 cm \* 35 cm coming over a belt large 45 cm .

**Define the ideal focal length** for surely acquiring an entire object, with at least 2 cm of exceeding tolerance in the direction of the motion, when the camera is elevated at 1.5 m from the belt.

Suppose You have available lens with focal length 35 mm, 50 mm and 75 mm: **choose the best one** for working at the distance which best fits 1.5 m, **compute the best height of the camera**, and **compute the achievable resolution**.

With this set up, **which is the highest speed of the belt** for being sure that we may acquire an entire object, when the camera works at 100 fps?

**How many large may be a detectable defect**, if You need at least 10 pixel for being correctly analysed by my software?

**ONLY FOR ERASMUS STUDENTS (additional 20 minutes):**

**Describe how the Hough Transform for circles works.**