# Distance Measurement Device

User Guide

#### 1 Overview

This device estimates distances using geometric principles with a folding ruler and string setup. Best accuracy is achieved when measuring objects significantly above or below eye level.

### 2 Required Equipment

- Folding ruler fully extended
- Circular string (neck loop)
- Long measuring string
- Distance measurement software

#### 3 Software Operation

#### 3.1 Input Values

Enter these measurements into the program:

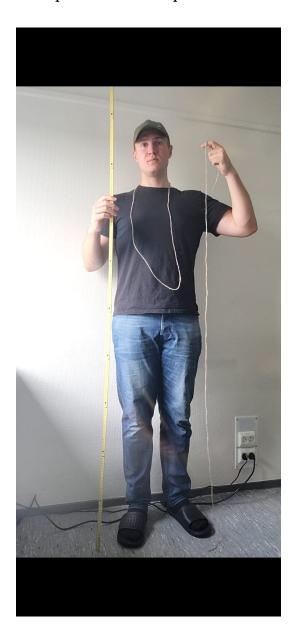
- Relative Height: Vertical offset to target (+ above, below eye level)
- Apparent Height: Ruler reading where target appears
- Observation Height: Your measured eye height

#### 3.2 Procedure

- 1. Start distance measurement program
- 2. Click "Use the Model"
- 3. Input three measurements
- 4. Receive distance estimate

# 4 Measurement Steps

### 4.1 Step 1: Initial Setup



- 1. **Extend** the ruler to full length
- 2. **Place** circular string around your neck
- 3. **Step on** the end of the long string

The setup creates the foundation for accurate measurements. Ensure stable footing throughout.

### 4.2 Step 2: Position Measuring Rod



- 1. **Insert** ruler through neck string
- 2. **Push** ruler away from body as far as possible
- 3. Let hang vertically, touching the ground
- 4. **Hold** the foot string at eye level

Critical: The ruler must hang perfectly vertical for accurate readings.

### 4.3 Step 3: Target Object Measurement



- 1. Locate your target object
- 2. **Choose** optimal angle: far above/below eye level
- 3. **Sight** the target along the ruler
- 4. **Read** height marking where target appears

**Tip:** For trees, aim for tip or base - choose the larger vertical offset from eye level.

# 4.4 Step 4: Eye Height Measurement



- 1. **Maintain** string position at eye level
- 2. Measure string length on ruler
- 3. **Keep foot** on string end throughout

This measurement determines your observation height - essential for accurate calculations.

#### 5 Best Practices & Common Errors

## **Optimal Conditions:**

- Target far above/below eye level
- Clear line of sight
- Stable, windless conditions
- Consistent string tension

#### **Common Errors:**

- Non-vertical ruler position
- Moving between measurements
- Ignoring vertical target offset
- Inconsistent string handling

**Technical Notes:** Uses similar triangles and machine learning corrections. Results are approximations - verify when precision is critical.

For technical details, refer to distance.py source code.