cos(pang) gives the ratio of the adjacent side (horizontal direction, or x-axis) to the hypotenuse (the overall movement vector).

sin(pang) gives the ratio of the opposite side (vertical direction, or y-axis) to the hypotenuse.

These ratios show how far the player moves in the horizontal (x) and vertical (y) directions compared to the hypotenuse (1 unit of movement in the direction the player is facing).

Multiplying by the speed factor scales the movement, giving the actual horizontal (pdx) and vertical (pdy) components of movement when the player moves in the direction of the hypotenuse (i.e., the player's facing angle).

Player Angle

(Direction of player movement)

$$cos = \frac{adjacent}{hypotenuse}$$

$$sin = \frac{Opposite}{Hypotenuse}$$

Hypotenuse

Opposite

p dy

$$pdy = sin(p\ ang) \times SpeedFactor$$

p ang

Adjacent

p dx

$$pdx = cos(p\ ang) \times SpeedFactor$$