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Comparison of lunar calendar with lunar phase that calculate from photos of the moon

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The Thai lunar calendar was made from the phase of moon to defined Buddhist days and Thai traditions. The waning moon is caused by a mutual orbit of the earth, the sun and the moon. Lunar phase is ratio of bright area to the total area. The different phase each day makes a cause in the lunar calendar. The moon's synodic period is 29.53059 days but number of days in each month must be integer. Therefore there are two type of Lunar month, the 29 day month (odd number month) and the 30 day month (even number month). We have been using lunar calendar for long time so it has error. This project wants to compare lunar phase calculated from photos of the moon with Thai calendar and that from Stellarium Program. The photos were taken on 7th - 9th , 14th - 15th day before new moon and 1st , 7th −9th day before full moon in 5th −7th month of lunar calendar in the year 2017. And more information was collected in 1st - 4th month of the lunar calendar in year 2018. From this, we enlarged the image, made a concentric circle and print the pictures on A4 paper. Next we measured radius and the longest of dark edge for each photo. Then we calculate the lunar phase from data and compared with calendar. The calendars determined that the increase and decrease of lunar phase for each day are constant, reference point is at 6 a.m. on 1st day before new moon at the starting of the month. The result shows this method can find the lunar phase from the photos at 3 decimal places. The lunar phase from the photos and the program are similar and error is linearly independent. When compared lunar phase from photos with the calendar, 9th day before new moon and 7th day before full moon are the most error. While 7th day before new moon, full moon day, 9th before full moon give the error close to zero. The graph error of time is similar the sine function. The error of lunar phase is positive; the lunar phase from photos more than theory. If elongation error is 6 degree, 57% of information isn't in the error range.

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