| Year | Light Activity | Pixel per Population | Estimated Population | Error (%) |
|------|------|------|------|------|
| 2000 | 3058 | 3622,249836 | 13104829,72 | 0,18 |
| 2001 | 2628 | 4296,807078 | 11262096,96 | 0,00 |
| 2002 | 2414 | 4762,19884 | 10345016,00 | 0,10 |
| 2003 | 2465 | 4746,114402 | 10563572,68 | 0,10 |
| 2004 | 2986 | 3988,859009 | 12796279,11 | 0,07 |
| 2005 | 2796 | 4337,831545 | 11982048,36 | 0,01 |
| 2006 | 3004 | 4111,686418 | 12873416,76 | 0,04 |
| 2007 | 2925 | 4298,74735 | 12534868,19 | 0,00 |
| 2008 | 2825 | 4494,571327 | 12106325,69 | 0,05 |
| 2009 | 2970 | 4348,538047 | 12727712,31 | 0,01 |
| 2010 | 3208 | 4132,071384 | 13747643,47 | 0,04 |
| Mean | 2843,54 | 4285,425022 | 12185800,84 | 0,06 |
| Std. | 249,87 | 327,3808266 | 1070801,34 | 0,05 |

Table 3. Estimated results for İstanbul population between 2000 and 2010

Real population for İstanbul is estimated between 2011 and 2013 by using average pixel per population and data between 2010 and 2010. Estimated population and error related to it are presented in Table 4.

| Year | Light Activity | Real Population | Estimated Population | Error (%) |
|------|------|------|------|------|
| 2011 | 3311 | 13624240,00 | 14189042,25 | 4,145569 |
| 2012 | 3112 | 13854740,00 | 13336242,67 | 3,742380 |
| 2013 | 3405 | 14160467,00 | 14591872,20 | 3,046546 |
| Mean | 3276 | 13879815,67 | 14039052,37 | 3,644833 |
| Std. | 149,60 | 268991,53 | 641111,61 | 0,555967 |

Table 4. Estimated population and error for Istanbul at 2011, 2012 and 2013

## 5. DISCUSSION

Population number is a parameter that changes every year. The fact that the population number can be estimated using light activity value and usage of 10-year data for this estimation have created effective results in this study. Estimated results with using polynomial approach are not shared. However, R value is calculated as 0.45. In this approach, 10-year data is used to estimate population number for next three years. Mean error is obtained as %3.64 for 2011, 2012 and 2013. This result comes into prominence that our presented method is a reliable and effective method. However, it is taken a consideration that each city must have own city model. In this study, the strong connection between population number and light activity is explained.

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